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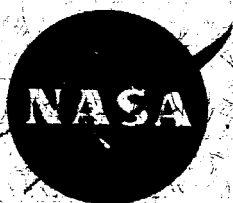
BUDGET EXECUTION AND REVIEW AT THE GODDARD SPACE FLIGHT CENTER

BY

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GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland

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BUDGET EXECUTION AND REVIEW AT THE GODDARD SPACE FLIGHT CENTER

INTRODUCTION

The purpose of this paper is to document the system in use at the Goddard Space Flight Center for the review and execution of its detail operating budget, including the application of computer technology to the process. Both the overall NASA budgetary process and the Goddard system are discussed: The NASA budgetary process must be understood in order to appreciate the problems, and hence the system, of the budgeting process at the Goddard Space Flight Center.

THE NASA BUDGETARY SYSTEM

NASA budgetary system is a time-phased process and uses a "Project Operating Plan", formerly called POP (Program Obligation Plan), for documentation which is required semi-annually. The Project Operating Plan requires that obligations and commitments be time-phased by month for the current fiscal year, by quarter for the next fiscal year, and by fiscal year for the next three years, along with an estimate of additional cost to completion and a total project cost from inception to completion.

The Project Operating Plan is used by NASA Headquarters to:

1. Review and approve individual Centers' Budgets by project; i.e., Orbiting Solar Observatories, Orbiting Geophysical Observatories, Nimbus, etc.
2. Review total NASA funding status (all years — prior, current and future).
3. Review individual Centers' performance by project and the time-phase as originally submitted by the Centers' Project Operating Plans. (Here originates the real problem, at least from the field Center's standpoint, of budget execution.)

THE GODDARD BUDGETARY SYSTEM

At Goddard, the "Grass Roots" concept of budgeting is employed which requires that the second line management level, normally the branches, to budget

for their specific needs. All funding requirements must be identifiable to a satellite series and must be specific as to spacecraft, subsystem such as controls, stabilization, structures, or to specific experiments. In no case is a branch authorized to combine the requirements of two spacecraft into one job order budget nor is he allowed to combine the spacecraft support or experiment requirements into one job order budget. In that Goddard is directly involved in 52 flight projects and 485 research tasks, this results in approximately 2,000 research and development job order budgets representing an annual budget of \$467,000,000 in FY 1967.

Since the sum of each job order budget is relatively large, Goddard's policy requires the following for each job order budget:

- a. Description of work to be performed
- b. Designation of the technical representative responsible for the effort to be performed under the budget
- c. Unique Job Order Number identification
- d. Funding estimates projected over 5 years and broken into the following eight major categories (Exhibit #1)

A 100 Routine Material Costs

A 200 Technical Information Support Services

A 300 Transportation

A 400 Fabrication Services

A 500 Non-personal (contractual) services — On-Site; both funding and man years of effort

A 600 Non-personal (contractual) services — Off-Site; both funding and man years of effort

A 700 Major Procurements; Each item must be detailed. (Major Procurements are defined as any purchase or contractual arrangement costing \$5,000.00 or more. In addition, all originators of major procurement budgets are required to state the type of contract desired, the month and year in which he expects to initiate procurement action (commitment) and his

estimate of when the Procurement Division expects to contractually obligate the procurement.) Each major procurement is assigned a separate number starting with 701.

A 800 Automatic Data Processing Equipment Purchases; description of purchase and estimated date of commitment and obligation is required.

Center Reviews of the Grass Roots Budget

Goddard's Grass Roots budget estimates are reviewed by the following levels of management:

Branch Heads

Division Chiefs

Project Managers

Procurement Division (for verification of estimated obligation date)

Assistant Directors

Director and Staff

Upon completion of management reviews the Budget Analysts coordinate the Center's submission of the Project Operating Plan to NASA Headquarters and prepares the transmittal letter. It is emphasized that the budget submission covers the entire life of each project, and is detailed as to spacecraft, experiments and ground operations and that all estimates of major procurements (approximately 90% of total dollars in budget) are time-phased by month for both commitments and obligations and that all contracts having a value of \$100,000.00 or more are included in our Budget Submission as a separate line item.

After the budget is approved by Center Management and submitted to NASA Headquarters, the entire job order budget is published and distributed to all operating officials of the Center. The budget is printed in two sequences, Project within Program, and Division by Branch, and finally all job order allocations are revised to state the Center-approved budget amounts.

Budget Execution

Goddard uses a report called the "Fiscal Status of the Budget" to monitor its execution of the Budget. The Fiscal Status of the Budget Report (Exhibit #2)

compares the actual fiscal transactions against the latest approved job order budgets and reveals by computer symbols the job orders of research projects which are not being executed in accordance with the approved budget. This report further identifies, in a time-phase sense, where the particular job order or project is behind in its plan; e.g., if the responsible Technical Representative has not initiated a procurement action for a particular major procurement by the end of the month in which he estimated on his original Job Order Budget, the computer annotates this as a "Tardy Commitment" and will provide this data to both the Project Manager and the Budget Analyst for follow-up action. If, on the other hand, the procurement action was initiated on time and the Procurement Division did not convert to a contractual obligation by the end of the month in which they projected it as an obligation, the computer will annotate this as a "Tardy Obligation" and will provide this data to the Project Manager, Procurement Division and to the Budget Analyst for their follow-up action.

In addition to reporting tardy commitments and tardy obligations, the computer is programmed to print out the next month's projection of commitments and obligations based on the approved Project Operating Plan. The value of this report is abundantly clear in that it provides everyone involved, including top Center Management, thirty days advance notice of what transactions are projected for the month and places the Center in a much better position to execute its budget in a timely manner.

Thus far, only the ability of this Fiscal Status of the Budget Report to print out the tardy commitments and tardy obligations has been discussed. This report has even greater utility in that it reveals the budgetary processes used by our scientific and technical staff and their history of use of the Center's facilities. For instance, through analysis of prior fiscal years' Fiscal Status of the Budget Report (June 30), an average routine cost per man of our scientific and technical staff has been determined, the branches of the Center that are the predominant users of the services of our Technical Information Division (Chart & Art Work, Printing, etc.) has been established, and branches that incur large costs for transportation (bills of lading) have been identified. In addition, analysis identifies which contractors were able to provide the particular services required. The report also reveals actual cost incurred against line items for which no budgeted amount was submitted or approved for the job order. This report shows how well the responsible Technical Representatives of the job order are able to estimate the costs of each major procurement required in the performance of his assignment; by analysis we have the ability to determine the degree of accuracy of each Technical Representative's performance. In some cases, as a result of these analyses, job order budget estimates are arbitrarily reduced while others are increased.

FISCAL STATUS OF THE BUDGET REPORT CONTENTS

The Fiscal Status of the Budget report presents data concerning three major areas:

1. Approved job order budgets
2. Commitment Data — Actual
3. Obligation Data — Actual

Approved Job Order Budgets

The Approved Job Order Budgets section of the Fiscal Status of the Budget Report represents the entire job order budget for the current Fiscal Year as approved by Center Management in the same detail as presented by the Technical Representative for the job order; who, as you recall, represented his estimates applicable to:

- A 100 Routine Materials
- A 200 Technical Information Support Services
- A 300 Transportation
- A 400 Fabrication Services
- A 500 Non-personal Services — On-site
- A 600 Non-personal Services — Off-site
- A 700 Major Procurements
- A 800 Automatic Data Processing Equipment Purchases

NOTE

At this point it should be stated that since the Major Procurements and Automatic Data Processing Equipment items constitute approximately 90% of the funding included in our Research and Development budget, all other line items (A100 - A600) do not require estimated month of commitment and obligation.

Commitment Data

Like all accounting systems, Goddard's accounting system collects costs in the same detail as its budget; therefore, every fiscal transaction must identify the particular job order and major category of the budget to which it should be charged. At this time, it should be pointed out that the computer edit programs contain this requirement as a prerequisite to acceptance by the computer as a valid charge. Further, the computer programs do not require that funds be available in these categories prior to funds certification; funds control at Goddard rests at the job order level. It is also noted that transactions costing less than \$15,000.00 are not reviewed by the Budget Analyst as are all larger transactions, but are processed directly to the Accounting Branch for funds certification and distribution after certification to our Procurement Division for obligation purposes.

The Commitment section of the Fiscal Status of the Budget Report indicates the actual commitment of funds against the individual budget items (A100 - A800). The following items are included in the commitment section: document number of the actual transaction authorizing commitment; description of item being committed; amount of commitment (rounded to nearest hundred of dollars); budget category being charged (A100 - A800); month and year committed; and Batch Number in which the Accounting Branch processed the transaction to the computer. Except for Major Procurements (A700's) and Automatic Data Processing Equipment (A800's), all other costs are summarized and compared to the total budget of the particular category.

At this stage of the report, it is possible to determine how well we are implementing the commitments in accordance with our budget requests (Project Operating Plan) to NASA Headquarters and if we are lagging in the execution. These deficiencies can be identified to a specific branch, job order and major procurement or purchase of automatic data processing equipment, and corrective action can then be taken. Further, it can be determined how well, or how poorly, we are executing, at least from a commitment standpoint, the remaining 10% of our budget.

Obligation Data

The Obligation section of the Fiscal Status of the Budget Report indicates the actual obligation of funds against the individual budget items. All obligation transactions must be related to the individual commitments which authorized the obligation; this identification is performed by the computer by means of cross reference. The computer abstracts from the obligation document the

document number which authorized the commitment, searches its memory for the original commitment, and abstracts from the commitment transaction the budget category or line item which initially authorized the obligation of funds.

Once the computer has determined what budgetary category authorized the obligation, it has determined the location of the obligation in the Fiscal Status of the Budget Report. Next, the computer determines if this obligation represents the entire use of the committed funds or whether this is a partial obligation, or if the obligation exceeds the original commitment. This is determined by means of a code placed on the obligation document by the Procurement Division negotiator. Partial use of funds is indicated by the letter "P". If a "P" appears, the computer accepts the obligation as is. If the obligation document indicated completed by the use of the letter "C", the computer compares the obligation to the initial commitment and increases, or reduces, the original commitment accordingly. The result of this transaction is included in all fiscal reports; in essence, our financial records are adjusted based upon inputs from the computer. As a result, there is no requirement to manually compare actual obligations with prior commitments and prepare manual adjustments to the computer. In this manner the Commitment section of the Fiscal Status of the Budget Report is automatically adjusted provided the obligation does not exceed the commitment by 10% or \$2,000, whichever is less.

In addition, the computer abstracts and includes in the report the commitment document number which authorized the obligation, the document number of the transaction which is obligating the funds, the contractor with which the order has been placed, the actual amount of the obligation and the batch number in which the Accounting Branch processed the obligation transaction to the computer. At this stage of the report, we are able to determine how well our Procurement Division is executing our obligation budget in accordance with our plan. It is important to remember that under Goddard's system of budget preparation it is the responsibility of our Procurement Division to validate the estimated obligation dates, not the scientific and technical personnel. Therefore, this section of the report is in total a measurement of Procurement's ability to meet their own forecast of obligations.

CONCLUSIONS

In addition to being an efficient and thorough budgetary process, Goddard's system affords management with unique by-products that are used in an effective manner to maintain a constant and current awareness of budgetary status and to provide the data necessary for initiating prompt management actions. Attention is called to the fact that each month NASA Headquarters reviews our

actual performance by project as to commitment and obligation of funds with the Center Director. By means of the Fiscal Status of the Budget Report, Center Management is briefed concerning our own performance under the budget prior to the time that NASA Headquarters reviews our performance with the Director. Hence, Management of this Center is fully prepared for any discussion with NASA Headquarters as it relates to possible failure to commit and obligate funds in accordance with the submitted budget. Conversely, when actual commitments and/or obligations exceed our budget estimates, specifics as to which transactions were processed ahead of schedule are readily determined.

ACKNOWLEDGEMENTS

Appreciation to Mr. Edgar Barrett, Head of the Business Data Branch of the Program Support Division, is hereby stated for his untiring efforts in bringing together all fiscal and budget data into an easily readable format.

AS OF DEC 31, 1966 PROC 12/30/66		BUDGET FISCAL STATUS-STATISTICAL		RESEARCH&DEVELOP		PAGE 216 RPT #1312	
NOTE... # INDICATES TARDY COMMIT, # INDICATES TARDY OBLIG.		BUDGET..BUDGET FISCAL UNCOMMITT..BUDGET FISCAL UNOBLIG..BTCH	OBLIGATION DATA.....			
JOB ORDER	PROCUREMENT	OBJCL	BUDGET..BUDGET FISCAL UNCOMMITT..BUDGET FISCAL UNOBLIG..BTCH	DATE	AMOUNT	DATE	BUDGET..NUMB
NUMBER	REQUEST NUMBER	DESCRIPTION	PAY OBLIG NUM AMOUNT..	DATE	AMOUNT	DATE	BUDGET..NUMB
611-879-10-0101 NUCLEAR SR-EMULSION COSMIC RAY PRO							
A100	TOTALS	ROUTINE	20	11	9	11	9
A200	TOTALS	TID SUPPORT	3	0	3	0	3
A300	TOTALS	TRANSPORTATION OF THINGS	3	0	3	0	3
A400	TOTALS	FABRICATION	9	64	55-	64	55-
A500	TOTALS	NONPERSONAL SERVICES,ON-SITE	88	55	33	55	33
A600	TOTALS	NONPERSONAL SERVICES,OFF-SITE	22	23	1-	23	1-
A701	TOTALS	NUCLEAR EMULSIONS /1/	10	11/66	01/67		
A701	COMMIT 7-611-33754	S-88699-G					1452
A701	OBLIG 7-611-33754	US NAVY	2610	10	08/66	10	10/66
A701	TOTALS	NUCLEAR EMULSIONS /1/	10	10		10	4503
A702	TOTALS	ELECTRONICS FOR TV MICROSCOPE/1/	0	12/66	02/67	0	
A702	TOTALS	ELECTRONICS FOR TV MICROSCOPE/1/	0				
A703	TOTALS	SPICE - PAYLOADS /1/	20	10/66	11/66	0	20
A703	TOTALS	###	20				
A704	TOTALS	REFURBISHING SPICE PAYLOADS /2/	15	01/67	01/67	0	15
A704	TOTALS	REFURBISHING SPICE PAYLOADS /2/	15				
A705	TOTALS	SPICE SOLID STATE DETECTORS /1/	23	01/67	02/67		
A705	COMMIT 7-611-33778	S-70010					1772
A705	COMMIT 7-611-34322	FUNDS	2511	15	08/66		7219
A705	OBLIG 7-611-33778	DEPT OF NAVY	2580	6	11/66		7492
A705	TOTALS	SPICE SOLID STATE DETECTORS /1/	23	21		15	8
A706	COMMIT 7-611-34342	S-12047-G					7262
A706	TOTALS	NO BUDGET ENTRY	0	18	11/66	0	
JOB ORDER TOTAL	611-879-10-0101		213	202	11	178	35